

# Air Force Advanced Composites Office (ACO)

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**Larry Coulter**  
**Air Force Advanced**  
**Composites Office**



# Overview



- **Advanced Composites**
- **Mission, Organization, and History**
- **Activities and Accomplishments**
- **Personnel**
- **Benefits of ACO**





# Advanced Composites



Advanced  
Composites

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**Definition:** *A fibrous material embedded in a resin matrix, generally laminated with fibers oriented in alternating directions to give strength and stiffness*

- **Benefits Of Advanced Composite Materials**

- Lightweight
- High Strength & Stiffness
- Tailorable Material Properties



- **Composites Use:**

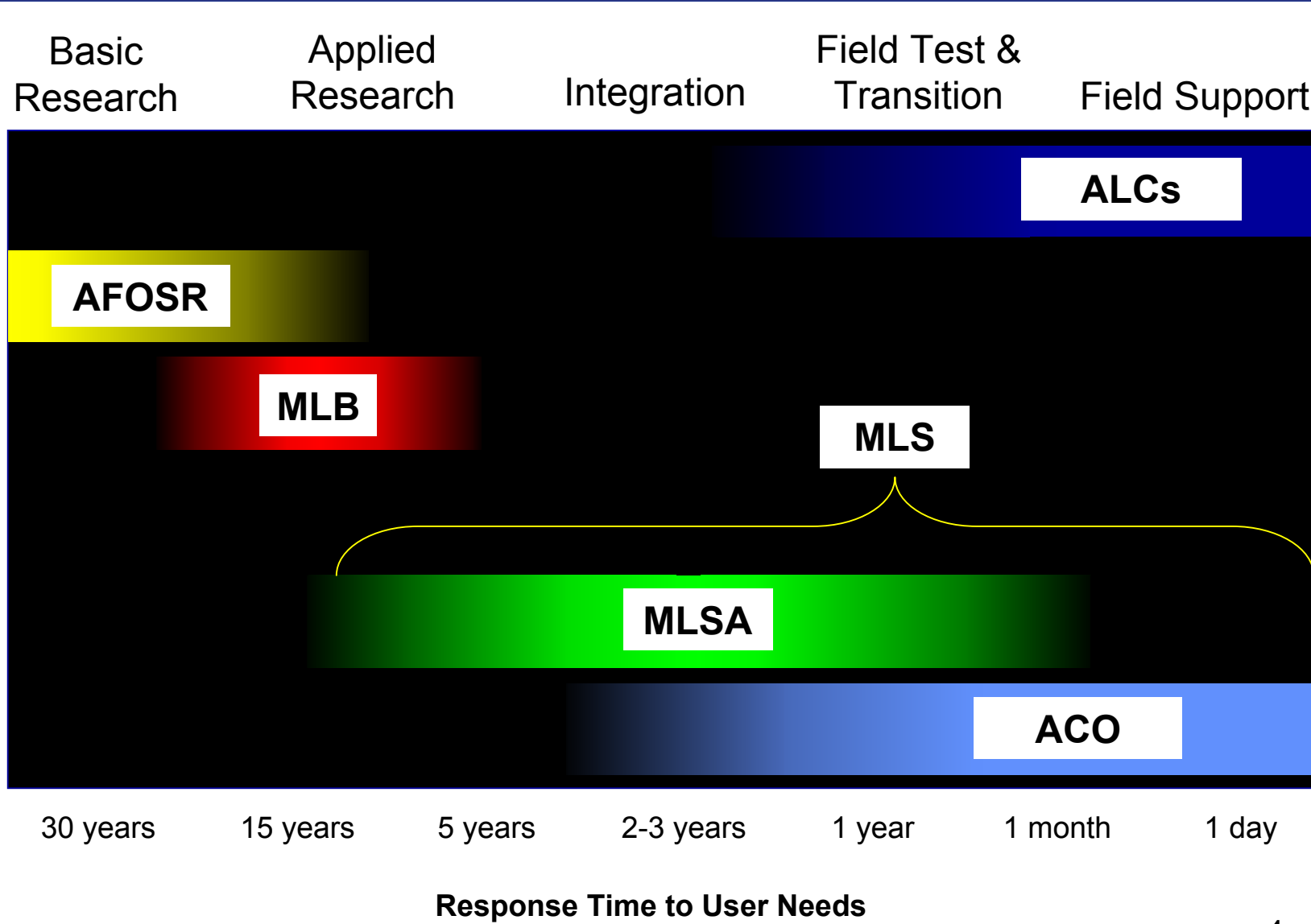
- Extensively Utilized On New Airframes  
(C-17 8% By Weight, B-2 37%, F-22 38%)
- Commonly Retrofitted To Older Aircraft As Parts Are Repaired And/Or Replaced
- Used As Patch And Doubler Material



# Composites Use Spectrum



- Advanced Composites
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- [Personnel](#)
- [Benefits of ACO](#)







## [Advanced Composites](#)

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## [Benefits of ACO](#)

- **AFRL is Headquartered at Wright Patterson AFB, Ohio**
- **Employs Over 6000 People**
- **Ten Technology Directorates at 12 Geographic Locales**
- **AFRL Mission**
  - **Leading the discovery, development, and integration of affordable warfighting technologies for our air and space forces.**
- **AFRL Vision**
  - **We defend America by unleashing the power of innovative aerospace technology.**



# ACO Organization



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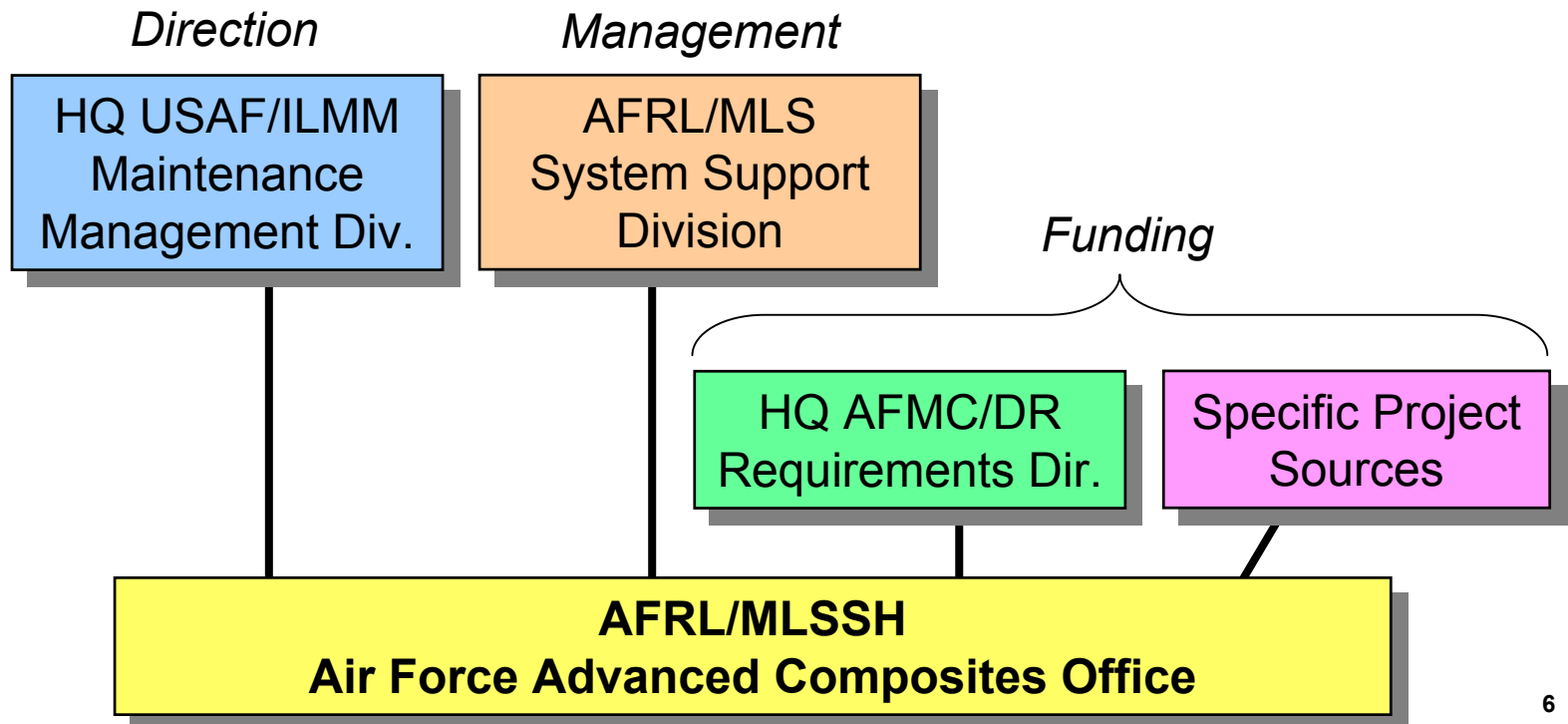
Mission,  
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[Benefits of ACO](#)

- Performing an Air Force Mission for HQ USAF/ILMM
- Managed by the Air Force Research Laboratory (AFRL)
- Funded by HQ AFMC/DR
- A Tenant at Hill AFB, UT





# Air Force Advanced Composites Office



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## Mission

*Assure the supportability of advanced composites at field operational units & air logistics centers and develop & maintain the engineering expertise to apply advanced composites to Air Force weapons systems*

- Directed by HQ USAF to Manage the Air Force Advanced Composites Program
- USAF Point of Contact for Composites Issues
- Support All Aspects of Composites Use
  - Design
  - Analysis
  - Repair
  - Safety
  - Training
  - Certification

## **Customers:**

- Field Units
- ALCs
- SPOs
- AFRL
- DoD



# What We Do



## Advanced Composites

Mission,  
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## Activities & Accomplishments

## Personnel

## Benefits of ACO

### AFI-21-105, "Aerospace Equipment Structural Maintenance"

- **Provide Engineering and Technical Assistance to Composites Users**
- **Manage Technical Order 1-1-690, *General Advanced Composite Repair Manual***
- **Provide and Support Advanced Composites Training**
- **Support Advanced Composites Health & Safety Issues**
- **Assist Technology Transfer**





# ACO Website



## [Advanced Composites](#)

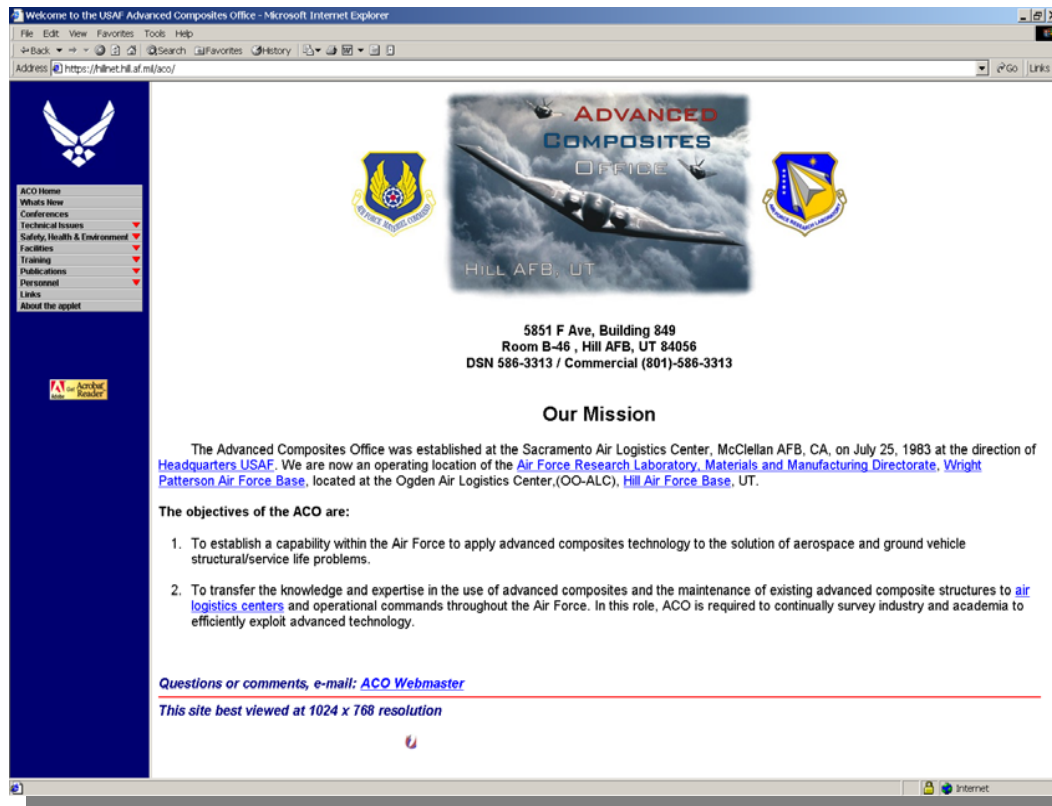
Mission,  
Organization,  
& History

## [Activities & Accomplishments](#)

## [Personnel](#)

## [Benefits of ACO](#)

- **ACO Provides a Comprehensive Web Site With A Variety of Information for Military Users**
- **<https://hillnet.hill.af.mil/aco/>**



## ***Features:***

- News
- Conferences
- Technical Issues
- Safety, Health, & Environment
- Facilities
- Training
- Publications
- Personnel



# ACO Newsletter



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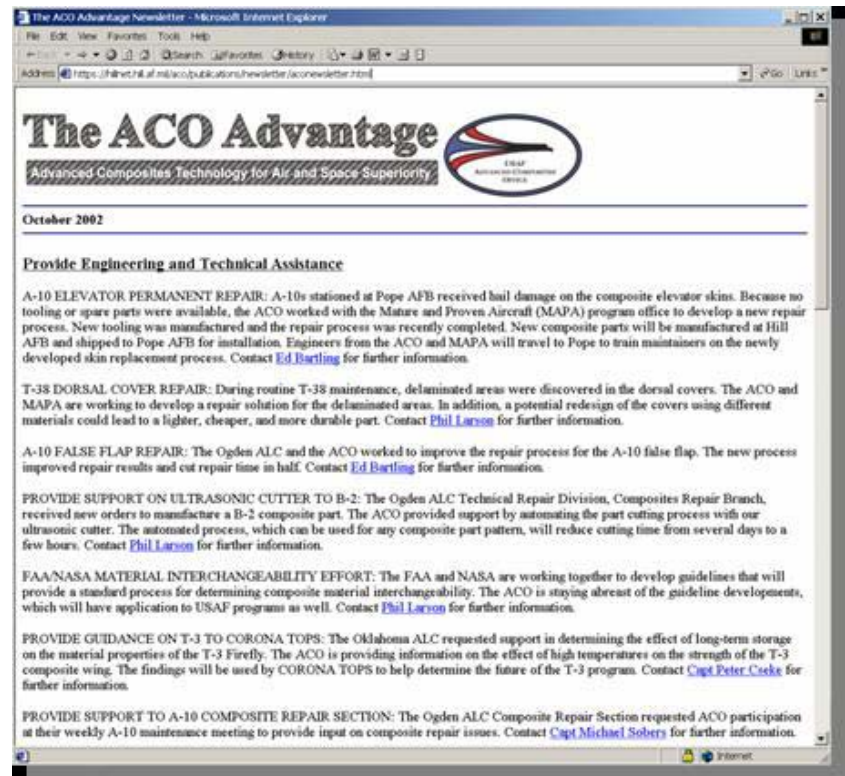
## [Personnel](#)

## [Benefits of ACO](#)

- **ACO Posts a Quarterly Online Newsletter**
- **Available on the ACO Website and Via E-Mail**

### ***Features:***

- Current ACO Projects
- ACO Points of Contact







# ACO History



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## [Benefits of ACO](#)

- **1985: ACO Formed at McClellan AFB as an Air Force Engineering Office Specializing in Composite Materials**
- **1994: Publication of AFI 21-105**
- **1995: ACO Becomes Part of Air Force Research Lab**
- **1999: Major Revision of AFI 21-105**
- **2000: McClellan ACO Closed, ACO Re-Opened at Hill AFB with All New Employees (BRAC Move)**
- **2002: Hill ACO Fully Staffed with 14 Employees**
- **2004: Adding Senior Non-commissioned Officer (SMSgt) To Aid In Liaison With Field Level Maintainers**



# Activities and Accomplishments



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## Upcoming Slides:

- Engineering and Technical Assistance
- T.O. 1-1-690
- Composites Training
- Health & Safety Issues
- Technology Transfer





# Engineering & Technical Assistance



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- **A-10 Elevator Skin Replacement Designed for Hail Damaged Aircraft at Pope AFB**
- **Replacement B-1B Bleed Air Duct End Caps Designed to Replace Existing Heat Damaged Parts**
- **Engineering Support for Aircraft Battle Damage Repair (ABDR) of F/A-22 Main Wing Following Live-Fire Tests**
- **Composites Maintenance and Support Planning for Future 767 Tanker and Surveillance Aircraft**



# Manage T.O. 1-1-690



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[Benefits of ACO](#)

- **New Version of Technical Order Released to Users in March 2002**
- **Continuing to Seek T.O. Improvements**
  - **Attempting to Remove from Limited Release List to Allow Easy Web Access**
  - **Comparing T.O. to Industry Practices**
  - **Will Increase Information on Hotbonders**
  - **Surface Preparation and Peel Plys Defined**



# Advanced Composites Training



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[Benefits of ACO](#)

- **Assistance to AF Schoolhouse at Pensacola**
  - **Mobile Training Class Available**
- **ACO Composites Training and Prototype Facility**
  - **11,000 sq ft, Fully Equipped**
  - **ACO is Teaching Specialized Topics in Advanced Composites to USAF Engineers**
- **Computer Based Training (CBT) Available On Several Subjects, More in Work**



# Health & Safety Issues



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[Benefits of ACO](#)

- **Composites Mishap Information Added to Chapter Three of T.O. 00-105E-9 (*Hazardous Materials, Events, and Response Procedures*)**
- **Emergency Response Checklist Revised with Updated Composite Materials Health and Safety Information**
- **Composites Mishap Safety Video and Response Handbook Under Development**





# Technology Transfer



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[Benefits of ACO](#)

- **State-based Processing Project with CTMA**
- **Re-configurable Tooling**
- **Portable Surface Prep (PACS) for ALC's and Composite Schoolhouse**
- **B-2 Hot Trailing Edge (HTE) Replacement Material Smoothly Transitioned From Lab to ALC**
- **Reconfigurable Tooling Blanket Prototype Obtained for Testing**



# ACO Personnel



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Personnel

[Benefits of  
ACO](#)

- **Nine Civilians**

- Office Chief
- Two Materials Engineers
- Aerospace Design Engineer
- Aeronautical Engineer
- Chemical Engineer
- Two Mechanical Engineers
- Computer Specialist

- **Four Military**

- Deputy Office Chief & Advanced Composites Structural Engineer (Captain)
- Two Additional Advanced Composites Structural Engineers (Captain, Lieutenant)
- SNCO Specialized in Field Maintenance



# Benefits of ACO



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Benefits of ACO

- **Single, Central Point of Contact with Resident Expertise**
  - Consistent, Accurate Guidance and Interpretation to SPOs, Air Logistics Centers, MAJCOMs, and Field Units
  - Centralized Problem Solving for All Customers
  - Clearinghouse for Information -- Web Site, Newsletter, Annual Conference
- **Visibility Across All MAJCOMs, Systems, and Programs**
  - Ability to Apply Lessons Learned Throughout USAF
  - Recognize and Address Composite Issues
- **Expert Evaluation of Materials and Processes**
- **Advocacy for Consideration of Composite Issues in Design**
- **(continued...)**



# Benefits of ACO



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Benefits of ACO

- **Credibility With Customers**
  - **USAF's Corporate Knowledge and Experience in Advanced Composites**
  - **Access to Experts Across the Communities of Interest**
  - **USAF's Representative to DoD and Industry**
  - **Record of Independent Judgment and Recommendations for All Customers**
- **Bridge Between Developers and Maintainers**
- **Oversight of AF Advanced Composite Program for Air Staff (by authority of AFI 21-105)**
  - **Able to Bring High-Level Attention to Issues**
  - **Independent View of Composites Programs at MAJCOMs, SPOs, and Depots**



# Review



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## Questions?

